

THE HOST PLANT ASSOCIATION AND LIFE HISTORY OF *TRICHOCHERMES WALKERI* FÖRSTER (PSYLLOIDEA: TRIOZIDAE)

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The comprehensive and authoritative handbook by Hodkinson & White (1979) on the identification of British Psylloidea, or jumping plant-lice, includes extensive information on the known host plant associations of the British species (in Appendix 1) and on their life history and phenology (in Appendix 2). A long-term population study of *Trichoermes walkeri* Förster since 1982 has furnished some additional information which supplements, and in part corrects, the data for this species given by Hodkinson & White (1979).

Trichoermes walkeri is a distinctive species on account of the attractively patterned forewings (depicted on figure 234 in Hodkinson & White (1979)) and by virtue of the nymphal development taking place within galls formed by upward rolling of the leaf margin of the host plant, buckthorn (the gall is shown on figure 985 in Docters van Leeuwen (1982)). The final nymphal instar (the fifth) is described and illustrated (figures 126–128) by White & Hodkinson (1982).

Hodkinson & White (1979) give four host plants for *T. walkeri* in their Appendix 1 (page 84) namely:

Rhamnus catharticus L., buckthorn or purging buckthorn;

R. alpinus L. and *R. erythroxylon* which are buckthorns not native to Britain;

Frangula alnus Mill., alder buckthorn.

At Chippenham Fen National Nature Reserve, Cambs. samples of *T. walkeri* galls have been taken annually, initially from two bushes and after 1986 from three bushes of *R. catharticus* at the south east corner of compartment 5 (TL 647694). These samples have enabled the population size of *T. walkeri* to be assessed, and in 1985 regular samples of galls taken through the summer allowed the progress of nymphal development to be recorded. Approximately 5.4 m from the main *Rhamnus* study bush is a single *Frangula alnus* bush, and this has been carefully examined annually for galls of *T. walkeri*. Over the ten years of the study not a single *T. walkeri* gall has been found on the *F. alnus*, though the population of the psyllid has remained established on all *R. catharticus* bushes in the vicinity, and exceeded 17 galls per 100 leaves on the main study bush in 1982, the year of greatest abundance. In view of the absence of *T. walkeri* galls on the *F. alnus* bush, despite strong populations of the psyllid on all nearby *R. catharticus* bushes, it seems very improbable that *Frangula* is a host plant for *T. walkeri*, at least in this country.

Hodkinson & White (1979) in their Appendix 2 (page 87) state that *T. walkeri* has one generation per year, overwinters as an adult (marked with a '?'), has a life cycle of their type 3 (marked with a '?'), and that adults have been observed in June, and in August to October. Observations of *T. walkeri* at Chippenham Fen, supplemented with less detailed studies at Bromholme Lane, Brampton, Hunts. (TL 225709), Foulden Common, West Norfolk (TF 7600), and Cavenham Heath National Nature Reserve, West Suffolk (TL 757728), have confirmed that this species has one generation per year, but have revealed a different life history from that suggested by Hodkinson & White (1979).

In the Autumn of 1982 small orange eggs were first observed on twigs of *R. catharticus* from Chippenham Fen, often close to buds. These eggs measure about 0.38 mm long by

0.14 mm wide and are pointed at one end, rounded at the other. It was thought likely that these were *T. walkeri* eggs and this has been confirmed by later observations.

An adult female *T. walkeri* was captured in a sample of twigs obtained from a *R. catharticus* bush at Bromholme Lane, Brampton, in October 1990. This female was confined in a plastic box with a small *Rhamnus* spur which already had about three of the orange eggs present. The female *T. walkeri* was observed making probing movements with her ovipositor around the spur, and a few days later additional orange eggs were noted in their typical positions, that is in depressions formed from old bud scale scars. This confirms that *T. walkeri* females lay small orange eggs on *Rhamnus* twigs during autumn.

On 18 May 1986 two first-instar psyllid nymphs were found on a *Rhamnus* twig at Chippenham Fen NNR. These were brought home and placed on a small potted *Rhamnus* on the evening of 19 May, and one was observed feeding on a leaf margin on 20 May. By 22 May this nymph was enclosed in a small leaf roll, which soon assumed the characteristic appearance of a *T. walkeri* gall. The growth of the leaf and associated gall are shown on Figure 1. An adult *T. walkeri* was observed to have emerged from this gall on 24 August 1986. This confirms that *T. walkeri* hatches in spring from overwintering eggs.

To summarize, the evidence from these observations indicates that *T. walkeri* overwinters in the egg stage, that egg-hatch takes place in May (shortly after bud-burst of *Rhamnus*) with the growth and development of galls proceeding as the leaves expand (see Figure 1). This is a type 1 life cycle as defined by Hodkinson & White (1979) (on page 2).

It is of interest that the gall produced by *T. walkeri* continues to increase in size after the leaf has ceased growing (Figure 1). This suggests that the metabolism of the host plant is modified by the insect forming the gall, so that growing leaf tissue is available after the time when leaves would normally have finished expanding. Sap-sucking insects, such as aphids and psyllids, are typically associated with actively growing, or senescent, plant tissue where food quality is good (see Dixon (1985) for

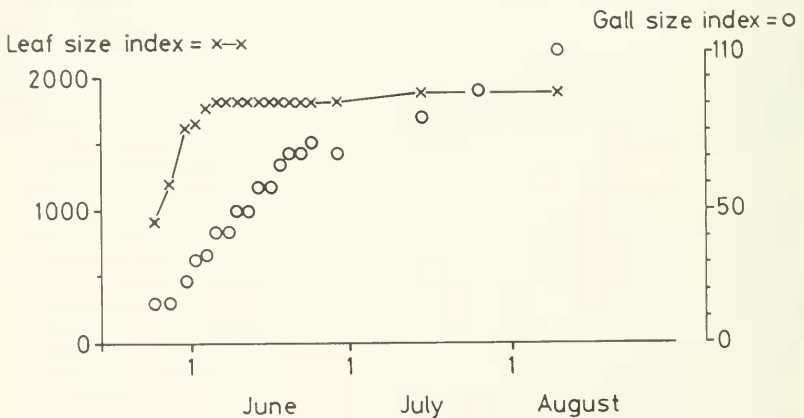


Fig. 1. Growth of a *Rhamnus* leaf and an associated *T. walkeri* gall in 1986. The leaf size index is leaf length (mm) multiplied by leaf width (mm); the gall size index is the gall length (mm) multiplied by gall width (mm).

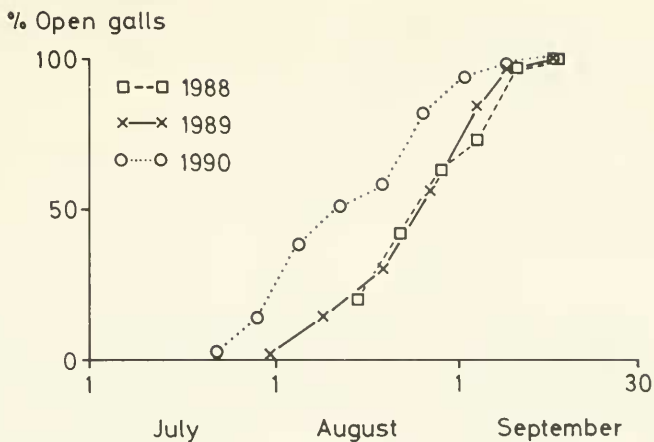


Fig. 2. The proportion of open galls of *T. walkeri* on a *Rhamnus* bush at Chippenham Fen NNR 1988–1990. On each visit 50 galls were examined in 1988 and 1989, and 100 galls were examined on each visit in 1990.

examples and discussion concerning aphids). During the summer, when trees and shrubs provide poor nutrition, a gall-forming life history is one way in which good nutritional conditions can be maintained for the actively growing early stages of sap-sucking insects.

The emergence of *T. walkeri* from galls has been studied at Chippenham Fen. The proportion of open galls, from which adult *T. walkeri* have emerged has been recorded on the main study tree since 1988. The results are presented on Figure 2, and they show that the first adults emerge from late July onwards. The earliest emergence was in 1990, an exceptionally advanced year due to the high spring and summer temperatures. It seems unlikely that, at least in East Anglia, *T. walkeri* adults could emerge from their galls as early as June (as reported by Hodkinson & White (1979)). Detailed observations of the timing of egg laying (made at Bromholme Lane, Brampton from September to December 1990) showed that females continue to lay eggs into October. Records of adult *T. walkeri* in water traps placed under the study bushes at Chippenham Fen in autumn 1991 continued into November, with the last record being a single female for the period 17 November to 1 December 1991. Therefore, the period of adult activity observed in this study has been from July to November.

ACKNOWLEDGEMENTS

I am grateful to the Nature Conservancy Council (since 1991 the Nature Conservancy Council for England) for permission to study *T. walkeri* at Chippenham Fen NNR and Cavenham Heath NNR and to Martin Twyman-Musgrave and Malcolm Wright, successively the wardens of these reserves, for their interest in, and support of, entomological investigations conducted on their sites. My wife Christine kindly helped with some of the data collection and she has given much assistance in continuing these studies of *T. walkeri*.

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SHORT COMMUNICATION

Anitys rubens (Hoffmann, J. J.) (Coleoptera: Anobiidae) new to Gloucestershire, and other deadwood beetles from Sherborne Park.—Sherborne Park (SP 1715) was first visited by the National Trust's Biological Survey Team in 1985, prior to its acquisition, and when little deadwood was available for investigation. Despite this, a few interesting deadwood Coleoptera were found, including *Abraeus granulum* Er. (Alexander, 1987) (still the only record for the county), and *Thanasimus formicarius* (L.). Since the Trust's acquisition, fallen trees and major limbs have largely been left *in situ*, and a return visit by the Survey Team on 24.viii.1992 found a much richer deadwood fauna than had been expected. One split fallen oak had exposed its well red-rotted heartwood and dead *Anitys rubens* were plentiful amongst the powdery rot. The red-rot was due to the fungus *Laetiporus sulphureus* (Bull. ex Fr.) which was extensively developed in the tree. *Anitys* was previously unknown in the county (Atty, 1983).

Under bark on the same tree was a specimen of another rare deadwood beetle, *Lyctus brunneus* (Steph.); interestingly, the only wild record for the county, as Atty (1983) gives only a 40-year-old record from Gloucester, where presumably it occurred as a timber pest. Other deadwood beetles found within the parkland on the same date included *Sinodendron cylindricum* (L.), *Ctesias serra* (F.), *Orchesia undulata* Kraatz, *Mycetophagus piceus* (F.), *Eledona agricola* (Herbst) and *Prionychus ater* (F.). *Triplax russica* (L.) had been found on the bracket fungus *Inonotus hispidus* (Bull. ex Fr.) growing on an old ash close by on 16.vii.1992.

The estate includes another historic parkland, Lodge Park (SP1412), and this also holds an interesting deadwood fauna. The 1985 survey noted *Mycetophagus atomarius* (F.) and *Anaglyptus mysticus* (L.), while a visit in 1990 yielded *Bitoma crenata* (F.), *Pediacus dermestoides* (F.), *Ctesias serra*, *Tetratoma fungorum* F. and *Thanasimus formicarius*.

Sherborne Park was apparently developed from an extensive area of pasture woodland in the late 16th century, while Lodge Park was enclosed in the early 17th century and incorporates part of an ancient wood. Thus a long and unbroken history of old trees is clearly the case for both sites and ties in well with the unusually rich deadwood fauna.—Keith N. A. Alexander, National Trust, 33 Sheep Street, Cirencester, Gloucestershire GL7 1QW.

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